USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY11 Final Performance Report
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Cover Page

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Fiscal Year:	FY11
USDA-ARS Agreement ID:	59-0206-9-090
USDA-ARS Agreement Title:	Integrated Management of Fusarium Head Blight in Indiana.
FY11 USDA-ARS Award Amount:	$ 11,422

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Integrated Management Strategies for Fusarium Head Blight of wheat in Indiana.	$ 5,772
MGMT	Efficacy of Fungicides/Biocontrol Products for FHB Management in Indiana.	$ 5,650
	Total ARS Award Amount	**$ 11,422**

Principal Investigator Date

* MGMT – FHB Management
FSTU – Food Safety, Toxicology, & Utilization of Mycotoxin-contaminated Grain
GDER – Gene Discovery & Engineering Resistance
PBG – Pathogen Biology & Genetics
BAR-CP – Barley Coordinated Project
DUR-CP – Durum Coordinated Project
HWW-CP – Hard Winter Wheat Coordinated Project
VDHR – Variety Development & Uniform Nurseries – Sub categories are below:
SPR – Spring Wheat Region
NWW – Northern Soft Winter Wheat Region
SWW – Southern Soft Red Winter Wheat Region

Project 1: *Integrated Management Strategies for Fusarium Head Blight of wheat in Indiana.*

1. **What major problem or issue is being resolved relevant to Fusarium head blight (scab) and how are you resolving it?**

   Fusarium Head Blight (FHB) levels on wheat vary each year in Indiana but the disease is consistently present and of concern to growers, and there is a need for effective FHB and deoxynivalenol (DON) management programs. Varieties with moderate resistance to FHB do not always provide desirable levels of disease control in certain environments, and fungicides have become an important component in FHB and DON management plans in the region. A research study was established in Indiana to determine how these tactics can be combined to provide improved control of FHB.

2. **List the most important accomplishment and its impact (i.e. how is it being used) to minimize the threat of Fusarium head blight or to reduce mycotoxins. Complete both sections (repeat sections for each major accomplishment):**

   Accomplishment:

   A research trial was conducted in West Lafayette, IN to evaluate the effect of genetic resistance and fungicide application to achieve optimal management of FHB. The fungicide Prosaro® was applied to experimental plots of six varieties of varying susceptibility to FHB. Non-treated plots of each of the varieties were included in the experiment to test the effects of a foliar fungicide application at Feekes 10.5.1, and variety susceptibility for improved FHB management. Treatments were replicated across plots that were inoculated with Fusarium graminearum, and non-inoculated plots were also included for each treatment. In comparisons between fungicide-treated and untreated plots of the same variety, fungicide-treated plots had lower disease levels and higher yields in all varieties. Combined management using resistant varieties and fungicide applications improved disease suppression when compared to susceptible varieties that received fungicide applications.

   Impact:

   The results of this research project indicate that a well-timed fungicide application can significantly reduce the impact of FHB and DON in wheat varieties, and increase yields in most varieties. This information is of primary importance to growers and is presented in various programs and field days, including the Purdue Wheat Production workshops. Research is also summarized in Extension articles to aid growers in managing FHB and DON in wheat. Additional research is needed to more thoroughly investigate the interaction between fungicide and variety susceptibility under Indiana conditions.

Project 2: *Efficacy of Fungicides/Biocontrol Products for FHB Management in Indiana.*

1. What major problem or issue is being resolved relevant to Fusarium head blight (scab) and how are you resolving it?

Fusarium Head Blight (FHB) levels on wheat vary each year in Indiana but the disease is consistently present and of concern to growers, and there is a need for effective FHB and deoxynivalenol (DON) management programs. Producers are interested in understanding which fungicides are most effective at managing disease, and also if fungicide modes of action influence the amount of DON in grain, and what application timings might influence this practice. A research study was established in Indiana to determine the impact of fungicide mode of action and timing on FHB and DON development.

2. List the most important accomplishment and its impact (i.e. how is it being used) to minimize the threat of Fusarium head blight or to reduce mycotoxins. Complete both sections (repeat sections for each major accomplishment):

Accomplishment:

A research trial was conducted in West Lafayette, IN to evaluate the effect of timing and fungicide mode of action on FHB and DON development. Fungicides were applied to experimental plots of P25R74, rated susceptible to FHB. Non-treated plots were included in the experiment also. In comparisons between fungicide-treated and untreated plots, fungicide-treated plots had lower disease levels and higher yields. However, only applications of Prosaro or Caramba at FGS 10.5.1 reduced FHB. DON was not increased by late applications of strobilurin fungicides, but DON also did not exceed 1.8 ppm in any treatment, including the non-treated control.

Impact:

The results of this research project indicate that Prosaro or Caramba applied at FGS 10.5.1 is most effective at reducing FHB compared to other fungicides and timings tested. All other fungicides did not significantly reduce the impact of FHB and DON, although all fungicides did increase yield. This information is of primary importance to growers and is presented in various programs and field days, including the Purdue Wheat Production workshops. Research is also summarized in Extension articles to aid growers in managing FHB and DON in wheat. Additional research is needed to more thoroughly investigate the interaction between fungicide and DON production under Indiana conditions.

Include below a list of the publications, presentations, peer-reviewed articles, and non-peer reviewed articles written about your work that resulted from all of the projects included in the grant. Please reference each item using an accepted journal format. If you need more space, continue the list on the next page.

Wise, K. 2011. Monitoring the risk of Fusarium Head Blight (Scab) in Indiana wheat Purdue Pest & Crop Newsletter. Issue 4 April 29, 2011.

Wise, K. 2011. Fusarium Head Blight update. Purdue Pest & Crop Newsletter. Issue 5: May 6, 2011.

Wise, K. 2011. Wheat disease update. Purdue Pest & Crop Newsletter. Issue 7: May 20, 2011.

Willyerd, K.T., Madden, L.V., Bradley, C.A., Bergstrom, G., Sweets, L., McMullen, M., Ransom, J., Grybauskas, A., Osborne, L., Wegulo, S., Hershman, D., **Wise, K**., Bockus, W., Padgett, G., Esker, P., Dill-Macky, R., Milus, E., and Paul, P.A. 2011. Efficacy and stability of integrating fungicide and cultivar resistance to manage Fusarium head blight and deoxynivalenol in wheat. Plant Dis. 96:957-967.